173. Proposed by P. C. CULLEN, Principal of Schools, Indianola, Neb.

To construct a circle tangent to a given line at a given point such that tangents drawn to this circle and passing through two fixed points shall be parallel.

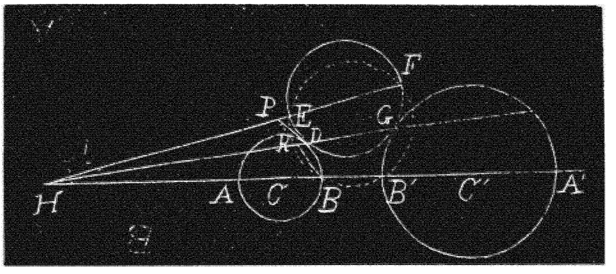
No solution of this problem has been received.

174. Proposed by J. M. HOWIE, Professor of Mathematics, The Nebraska State Normal School, Peru, Neb.

Describe a circle which shall pass through a given point and be tangent to two given circles.

Solution by G. B. M. ZERR, A. M., Ph. D., The Temple College, Philadelphia, Pa., and M. E. GRABER, Heidelberg University, Tiffin, Ohio.

Let C, C' be the centers of the given circles; E the given point. Describe a circle through EBB' and let H be the homothetic center of C, C'. Draw FEH and $B'BH$. Let the circle through $B'BE$ cut C again in R. Draw BRP and from P draw PD tangent to C, then the circle circumscribing the triangle FED is the circle required, for $HD.HG=HB'.HB$. Since there can be two tangents drawn from P to C, there can be drawn two circles tangent to C, C' so that the line joining their points of contact shall pass through H. Similarly, two circles can be drawn tangent to C, C' passing through E so that the line joining their points of contact shall pass through the anti-homothetic center H' lying between C and C'.



Therefore, there are four circles satisfying the condition.

175. Proposed by W. P. WEBBER, Mississippi Normal College, Houston, Miss.

A field is enclosed by a fence in circular form and a straight gate 20 feet wide. The fence is 100 feet in length. How much land is in the field? [Solution by most elementary method possible.]

Solution by G. B. M. ZERR, A. M., Ph. D., The Temple College, Philadelphia, Pa.; J. SCHEFFER, A. M., Hagerstown, Md.; and the PROPOSER.

Chord $AB=20$, arc $ADB=100$.

Let $\angle ACB=\theta$, $AC=r$.

Then $[2\pi-\theta]r=100$, $r\sin\frac{1}{2}\theta=10$.

$\therefore$ $2\pi=\theta+10\sin\frac{1}{2}\theta$.

$\therefore$ $\theta=62°\ 32'$ nearly, $r=19.267$ feet.

Area sector $ADB=\dfrac{[360°-62°\ 32']\pi r^2}{360°}$

$=963.64$ square feet.

Area triangle $ACB=164.69$ square feet.

Total area$=1128.33$ square feet.